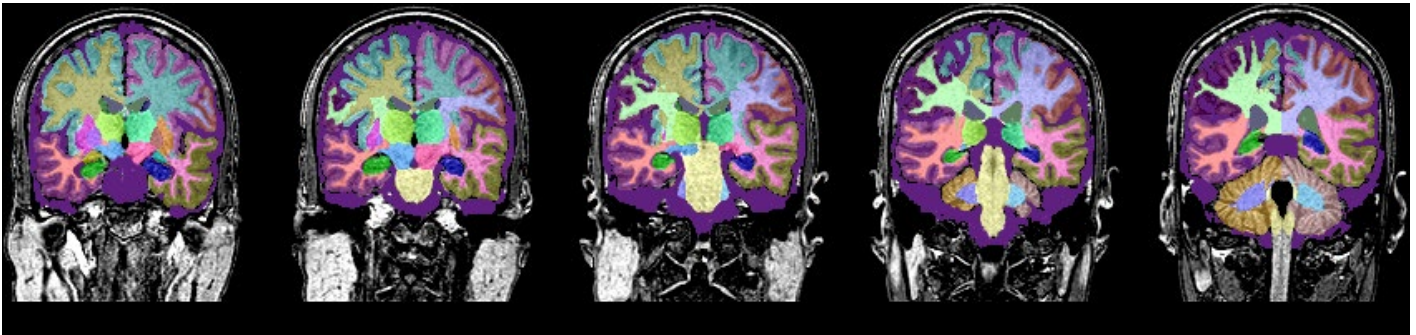
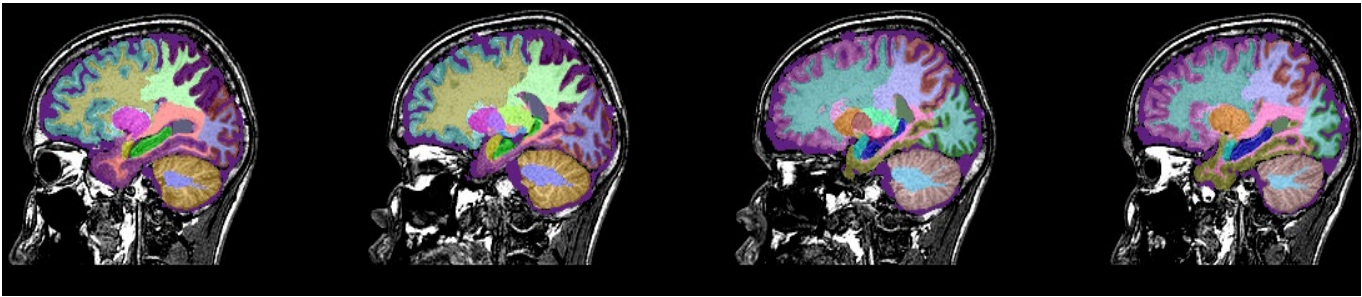




eFigure 1: An example of segmentation of brain image using Neuroreader. MRI of an 18 year old male with NS.

eTable 1: Comparison of gait abnormalities and regional brain volumes in NS

	Abnormal Gait Mean Volume ratio $\pm$ SD(n)	Normal Gait Mean Volume ratio $\pm$ SD (n)	corrected p-value (adjusted for multiple comparison, age and sex)
Whole Brain	(9) 54.7 $\pm$ 2.4	(30) 62.3 $\pm$ 5.0	0.006
White Matter	(9) 23.4 $\pm$ 2.2	(30) 26.0 $\pm$ 2.4	0.047
Grey Matter	(9) 31.3 $\pm$ 2.2	(30) 36.2 $\pm$ 4.3	0.038
Hippocampus	(9) 0.474 $\pm$ 0.044	(30) 0.457 $\pm$ 0.032	0.386
Amygdala	(9) 0.185 $\pm$ 0.023	(30) 0.183 $\pm$ 0.021	0.758
Brainstem	(9) 0.899 $\pm$ 0.081	(30) 1.033 $\pm$ 0.116	0.018
Caudate	(9) 0.463 $\pm$ 0.028	(30) 0.471 $\pm$ 0.069	0.798
Cerebellum	(9) 5.31 $\pm$ 0.77	(30) 6.89 $\pm$ 1.11	0.006
Lateral Ventricle	(9) 1.65 $\pm$ 0.99	(30) 1.40 $\pm$ 0.73	0.512
Putamen	(9) 0.623 $\pm$ 0.072	(30) 0.663 $\pm$ 0.072	0.659
Thalamus	(9) 1.07 $\pm$ 0.07	(30) 1.11 $\pm$ 0.08	0.512

Frontal Lobe	(9) 19.8 ± 0.9	(30) 22.7 ± 1.7	0.006
Parietal Lobe	(9) 10.0 ± 0.5	(30) 11.2 ± 0.9	0.018
Occipital Lobe	(9) 4.64 ± 0.40	(30) 5.37 ± 0.51	0.009
Temporal Lobe	(9) 11.3 ± 0.5	(30) 12.0 ± 1.0	0.360
Pallidum	(9) 0.175 ± 0.019	(30) 0.184 ± 0.030	0.798

eTable 2: Association between regional atrophy and functional status (measured by mRS score) in NS, adjusted for sex and NS duration

	partial_Correlation	p_corrected
Whole Brain	-0.51	0.004
White Matter	-0.13	0.682
Grey Matter	-0.55	0.004
Hippocampus	-0.09	0.779
Amygdala	0.04	0.896
Brain Stem	-0.33	0.118
Caudate	0.07	0.799
Cerebellum	-0.47	0.007
Lateral Ventricle	0.01	0.940
Putamen	-0.20	0.460
Thalamus	-0.17	0.526
Frontal Lobe	-0.45	0.015
Parietal Lobe	-0.53	0.004
Occipital Lobe	-0.52	0.004
Temporal Lobe	-0.31	0.128
Pallidum	0.03	0.896

eTable3: Correlation between brain region volumes and Hu_leiomodin-1 in NS (39 cases)

	Correlation	p-value
Whole Brain	0.04	0.99
White Matter	0.01	0.99
Gray Matter	0.05	0.99
Hippocampus	0.25	0.68
Amygdala	0.24	0.68
Caudate	0.09	0.99
Cerebellum	0.05	0.99
Lateral Ventricle	-0.3	0.68
Putamen	0.12	0.99
Thalamus	0.16	0.99
Frontal Lobe	0.000	0.99
Parietal Lobe	0.08	0.99
Occipital Lobe	0.07	0.99
Temporal Lobe	-0.03	0.99
Pallidum	-0.22	0.68

eTable 4: Correlation with brain region volumes and Hu-Leiomodin-1 in OAE (14 cases)

	Correlation	p-value
Whole Brain	-0.33	0.937
White Matter	-0.13	0.98
Gray Matter	-0.36	0.94
Hippocampus	-0.19	0.98
Amygdala	-0.01	0.98
Caudate	0.12	0.98
Cerebellum	-0.42	0.98
Lateral Ventricle	0.11	0.98
Putamen	0.08	0.98
Thalamus	0.04	0.98
Frontal Lobe	-0.17	0.98
Parietal Lobe	-0.06	0.98
Occipital Lobe	-0.02	0.98
Temporal Lobe	-0.49	0.94
Pallidum	-0.18	0.98

eTable 5: Correlation with brain region volumes and OV-16 IgG in NS (39 cases)

	Correlation	p-value
Whole Brain	-0.2	0.63
White Matter	-0.01	0.79
Gray Matter	-0.19	0.63
Hippocampus	0.17	0.63
Amygdala	-0.10	0.79
Caudate	0.02	0.90
Cerebellum	-0.26	0.63
Lateral Ventricle	0.05	0.87
Putamen	-0.06	0.87
Thalamus	-0.03	0.90
Frontal Lobe	-0.22	0.63
Parietal Lobe	-0.05	0.87
Occipital Lobe	-0.21	0.63
Temporal Lobe	-0.16	0.63
Pallidum	0.16	0.63

eTable6: Correlation with brain region volumes and OV-16 IgG in OAE (14 cases)

Ov16	Correlation	p-value
Whole Brain	0.18	0.93
White Matter	-0.02	0.93
Gray Matter	0.26	0.93
Hippocampus	-0.06	0.93
Amygdala	0.07	0.93
Caudate	0.08	0.93
Cerebellum	0.32	0.93
Lateral Ventricle	-0.22	0.93
Putamen	0.14	0.93
Thalamus	0.11	0.93
Frontal Lobe	0.22	0.93
Parietal Lobe	0.16	0.93
Occipital Lobe	-0.47	0.93
Temporal Lobe	-0.03	0.93
Pallidum	0.06	0.93